

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
12 September 2003 (12.09.2003)

PCT

(10) International Publication Number
WO 2003/074601 A3

(51) International Patent Classification⁷: **C08K 5/42**,
C08L 79/02, 65/00, B41M 1/30, H01B 1/12

South, Greenville, DE 19807 (US). GAO, Feng [US/US];
48 Westwoods Blvd., Hockessin, DE 19707 (US).

(21) International Application Number:
PCT/US2003/005771

(74) Agent: SIEGELL, Barbara, C.; E.I. DUPONT DE
NEMOURS AND COMPANY, LEGAL PATENT
RECORDS CENTER, 4417 Lancaster Pike, Wilmington,
DE 19805 (US).

(22) International Filing Date: 26 February 2003 (26.02.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/360,999 1 March 2002 (01.03.2002) US

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW.

(71) Applicant (*for all designated States except US*): E.I. DU
PONT DE NEMOURS AND COMPANY [US/US]; 1007
Market Street, Wilmington, DE 19898 (US).

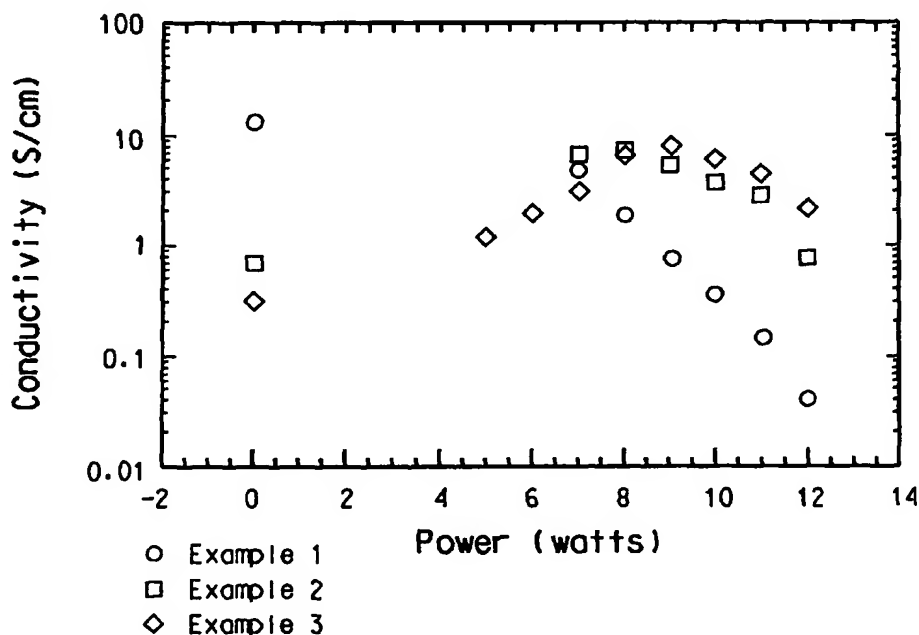
(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI,
SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): BLANCHET-
FINCHER, Graciela, Beatriz [US/US]; 8 Pheasant Ridge

[Continued on next page]

(54) Title: PRINTING OF ORGANIC CONDUCTIVE POLYMERS CONTAINING ADDITIVES



(57) Abstract: Additives to organic conducting polymers are described which enhance adhesion and resolution of printed films while retaining adequate electrical conductivity. The conductive polymer films are useful in printing conductive portions of thin film transistors such as sources and drains. Additives include surfactants, second macromolecules, plasticizers, and excess sulfonic acids.

**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations
- of inventorship (Rule 4.17(iv)) for US only

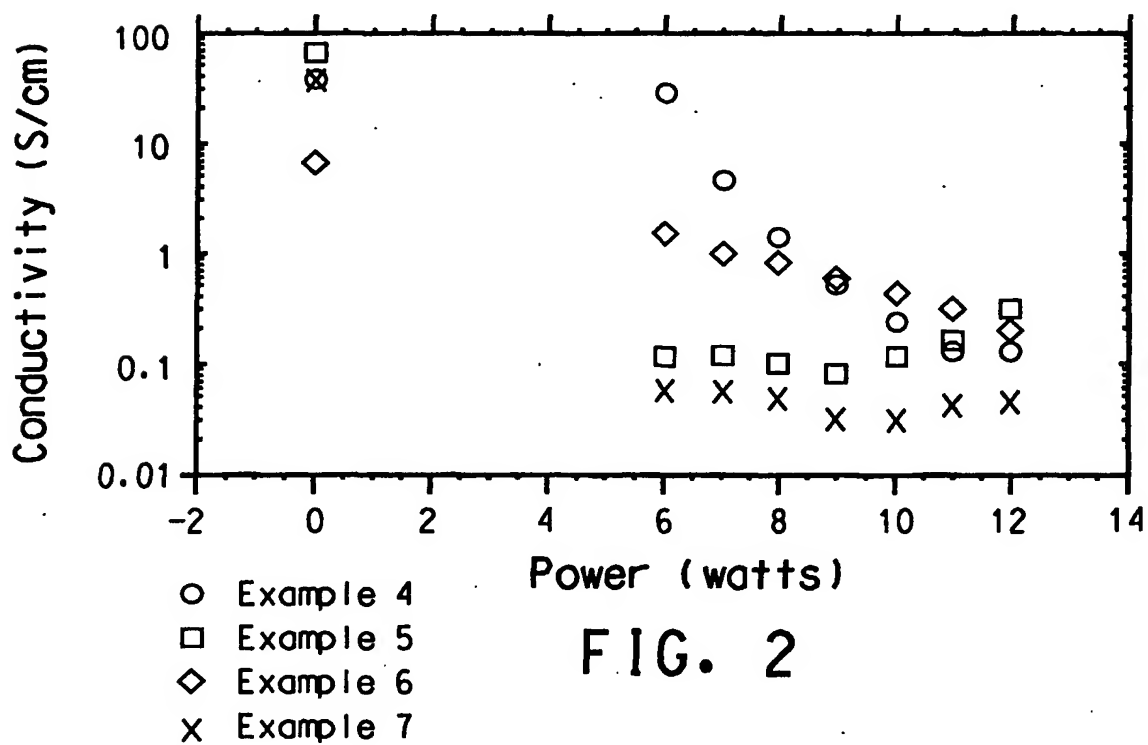
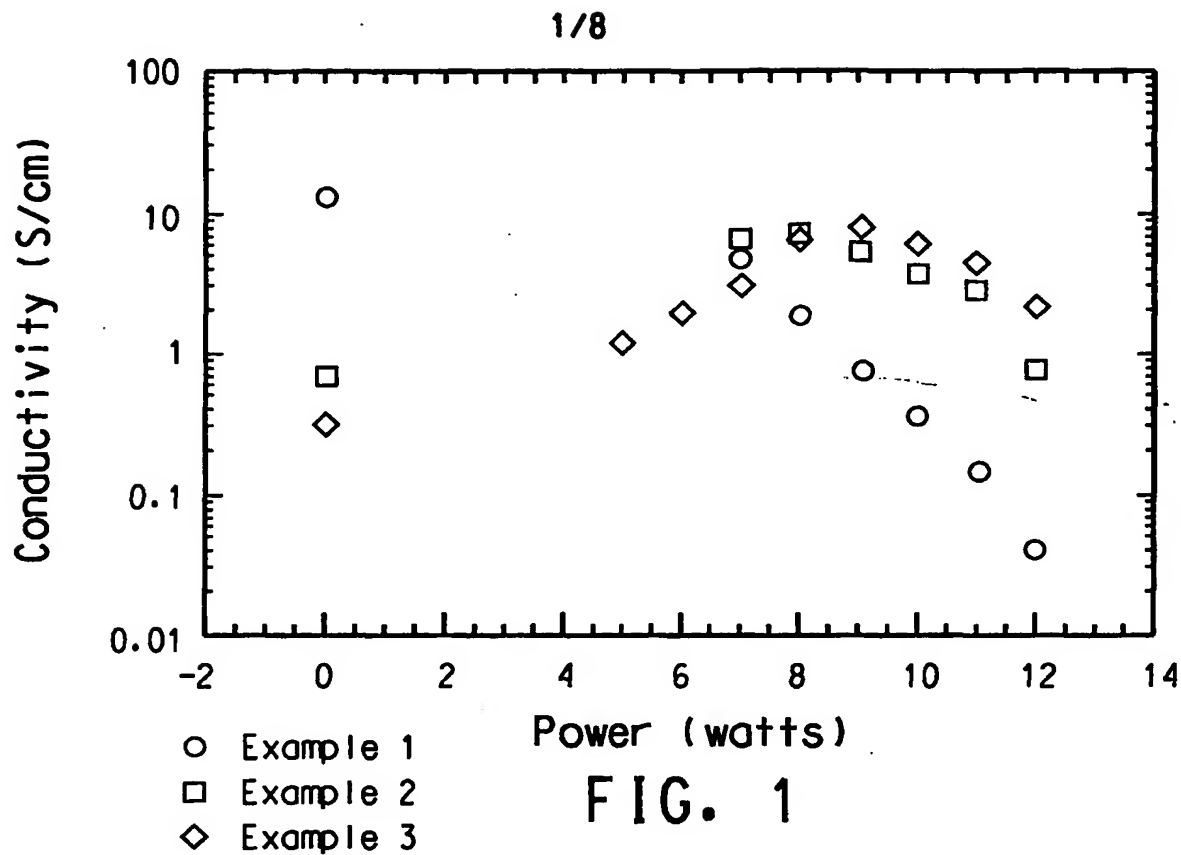
Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:

29 July 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.



2/8

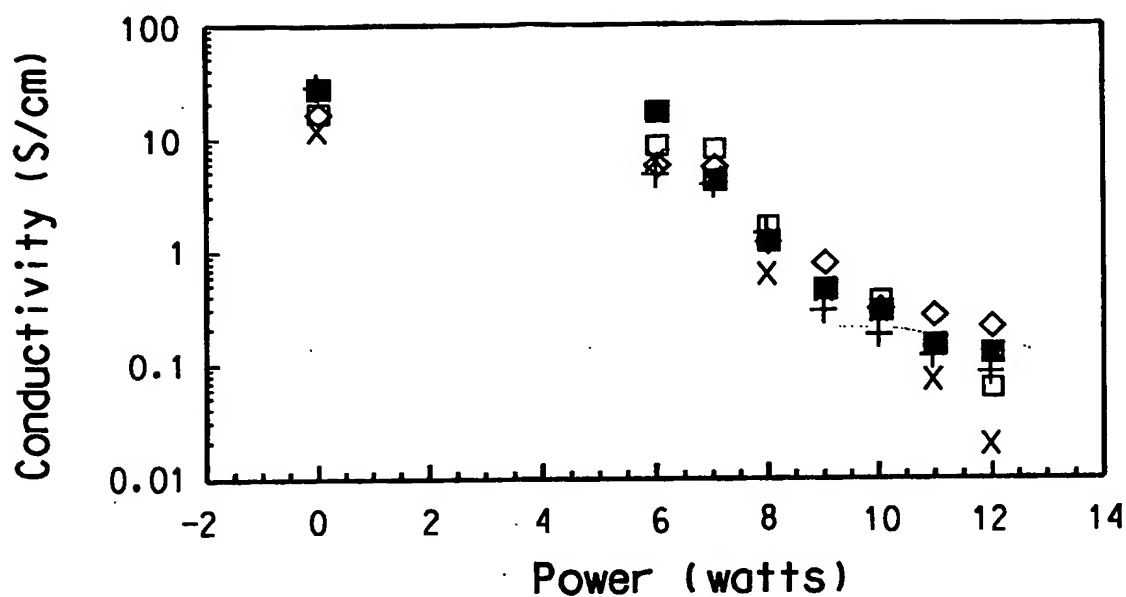


FIG. 3

■ L5000 (Control)
 □ Example 8
 ◇ Example 9

× Example 10
 + Example 11

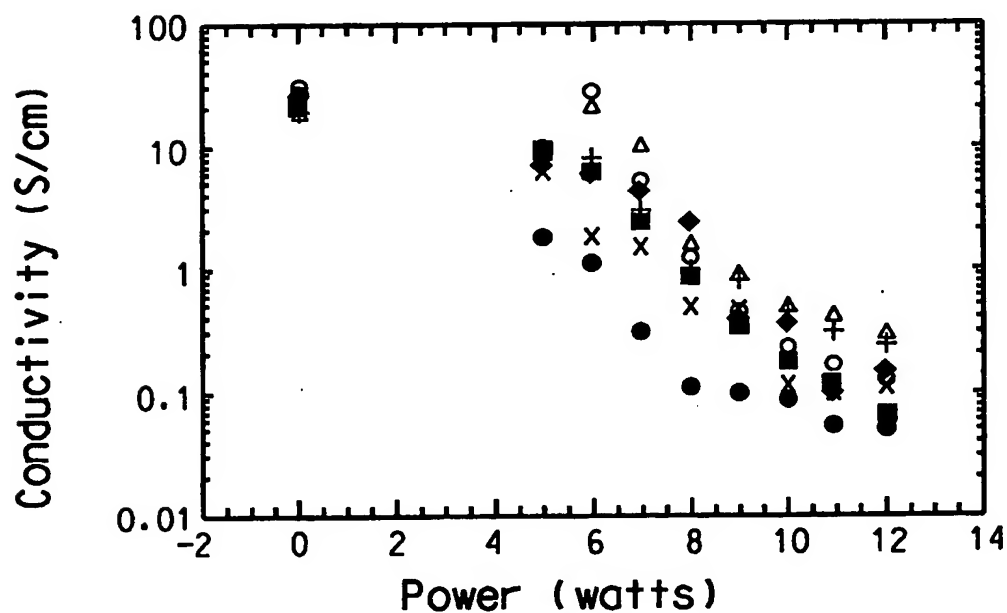
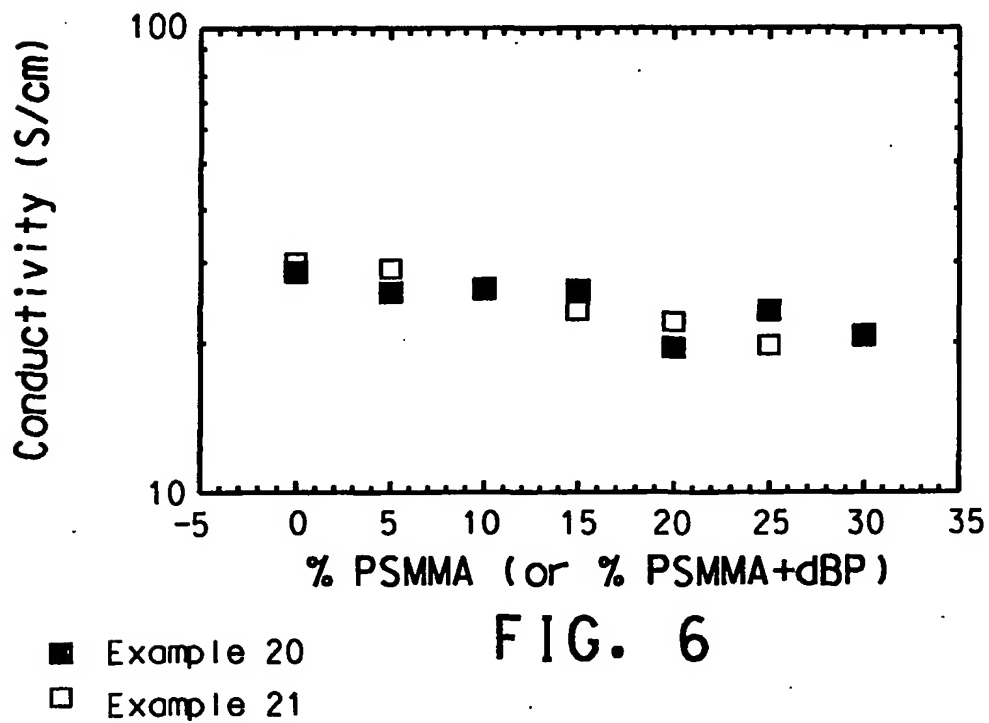
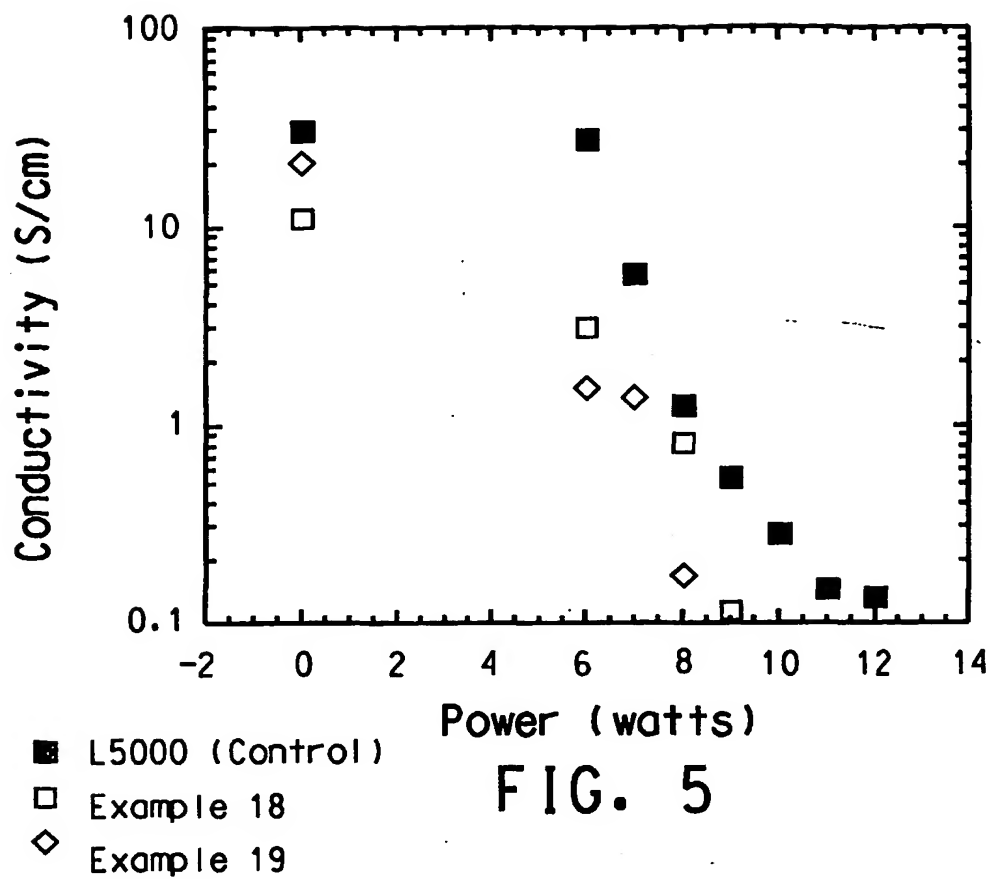


FIG. 4

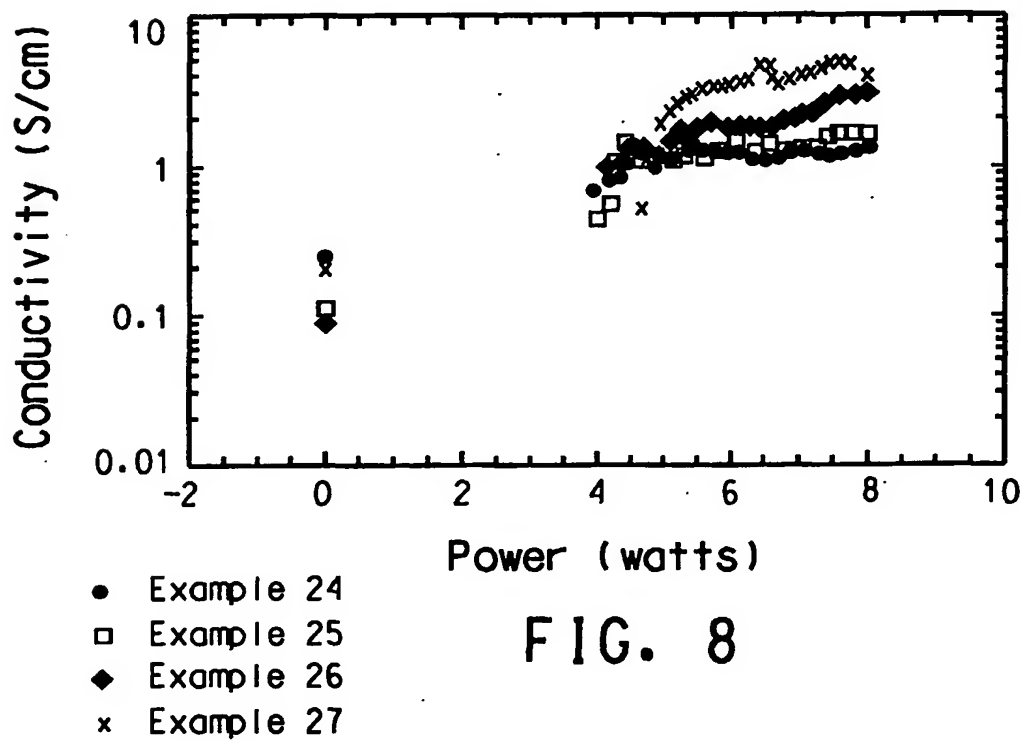
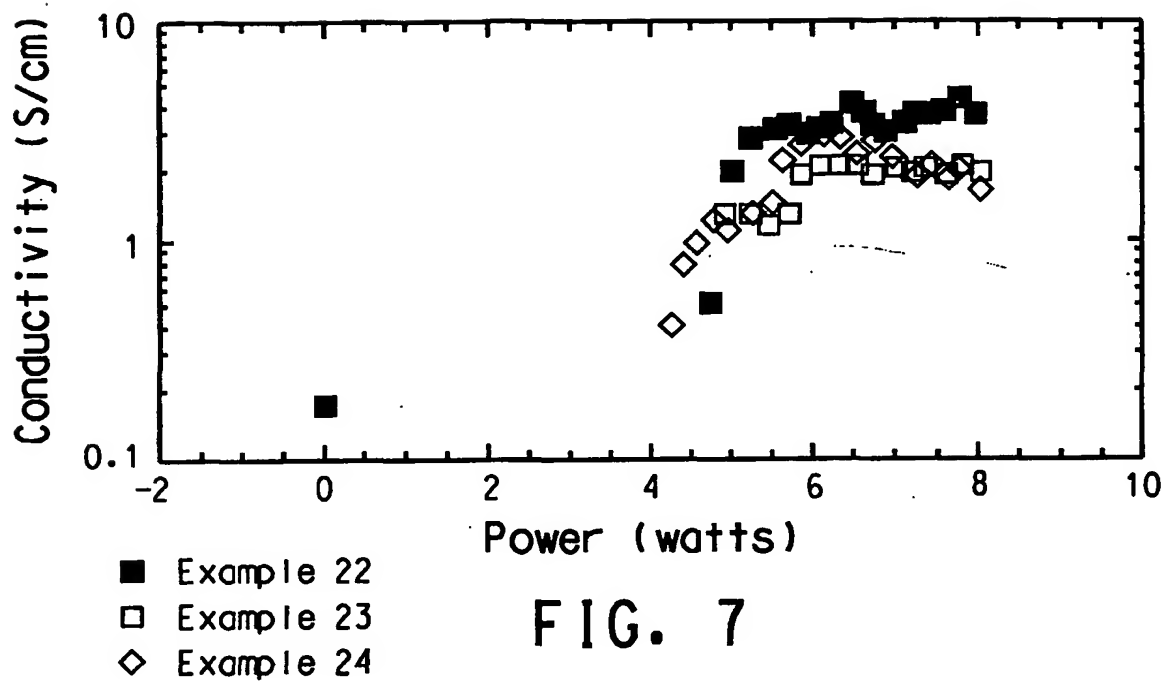
○ L5000 (Control)
 + Example 12
 × Example 13
 △ Example 14

◆ Example 15
 ■ Example 16
 ● Example 17

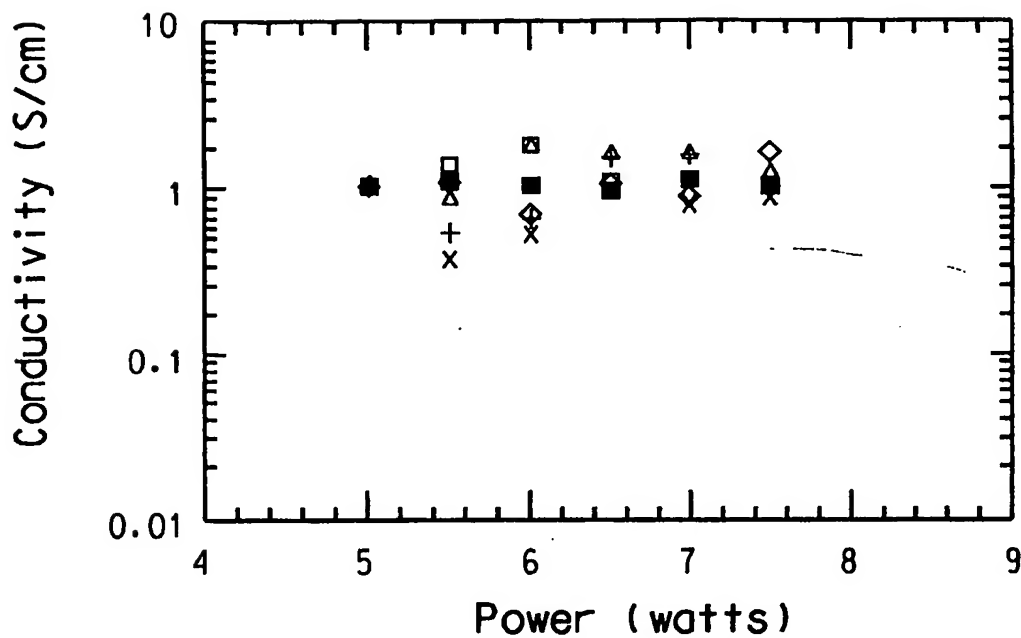
3/8



4/8



5/8



- Example 28
- Example 29
- ◇ Example 30
- x Example 31
- + Example 32
- Δ Example 33

FIG. 9

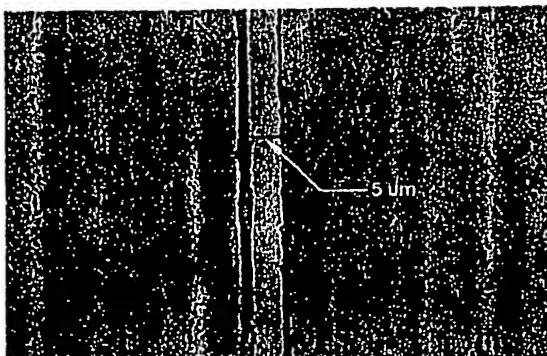


FIG. 10

BEST AVAILABLE COPY

6/8

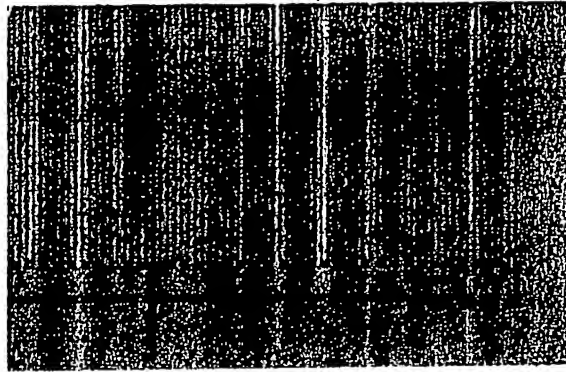


FIG. 11

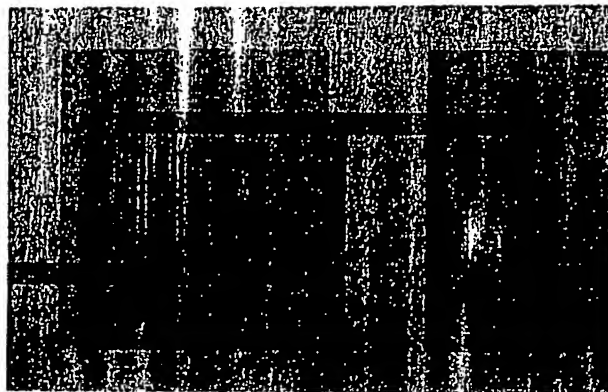


FIG. 12

BEST AVAILABLE COPY

7/8

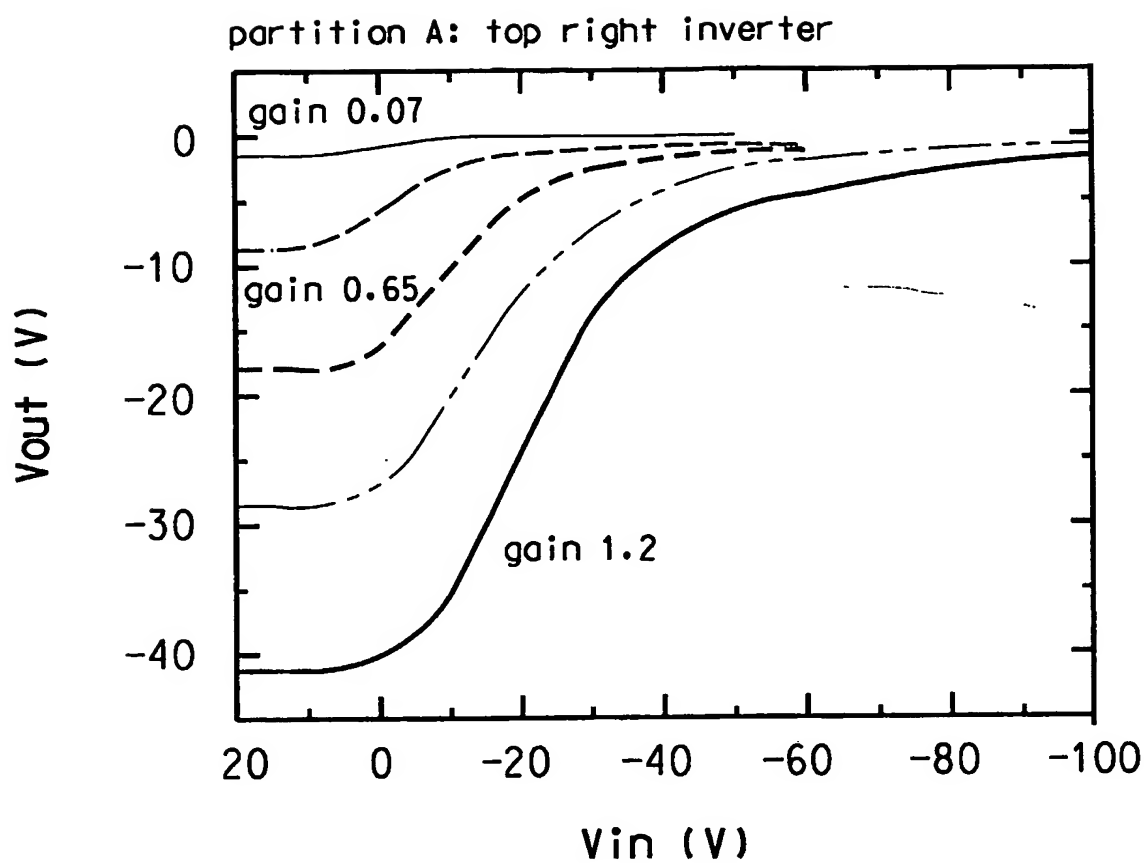


FIG. 13

— $V_{dd} = -20V$
- - - - - $-40V$
- - - - - $-60V$
- - - - - $-80V$
- - - - - $-100V$

8/8

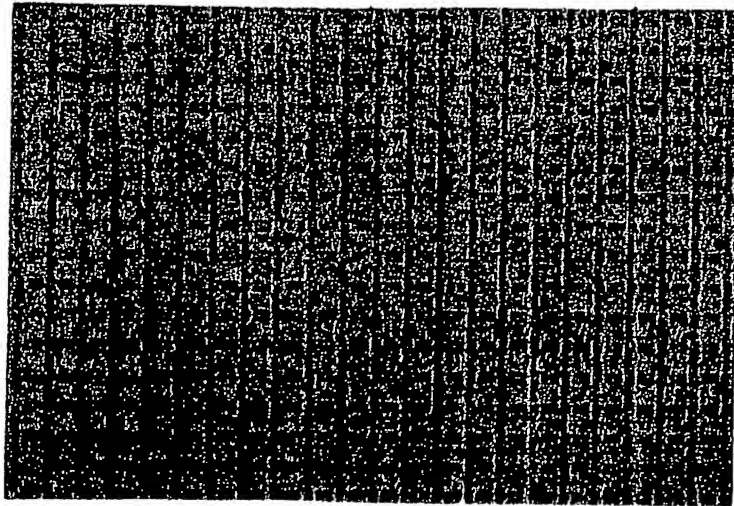


FIG. 14

BEST AVAILABLE COPY

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/05771

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C08K5/42 C08L79/02 C08L65/00 B41M1/30 H01B1/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C08K H01B B41M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98/05040 A (COMMISSARIAT A L'ENERGIE ATOMIQUE) 5 February 1998 (1998-02-05) page 6, line 1 - line 24 page 7, line 9 - line 13 page 8, line 3 - line 14; claims 1-13	1, 2, 10
X	US 5 320 780 A (G. R. UNRUH) 14 June 1994 (1994-06-14) column 4, line 51 - column 5, line 66 column 6, line 32 - column 7, line 7; claims 1-19	1, 2, 9
Y	WO 95/27289 A (FRANCE TELECOM) 12 October 1995 (1995-10-12) page 1, line 1 - line 21 page 5, line 23 - page 7, line 10; claims 1-23	1-15
	----- -/-	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *Z* document member of the same patent family

Date of the actual completion of the international search

3 June 2004

Date of mailing of the international search report

14/06/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Permentier, W

INTERNATIONAL SEARCH REPORT

Int. Application No.

PCT/US 03/05771

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 99/18621 A (BASF AG) 15 April 1999 (1999-04-15) page 26, line 16 - page 27, line 19; claims 1-12 -----	1-15
Y	EP 1 052 654 A (UNION CARBIDE CHEMICALS & PLASTICS TECHNOLOGY CORPORATION) 15 November 2000 (2000-11-15) page 4, line 55 - page 5, line 13 page 5, line 53 - line 58; claims 1-10 -----	1-15
Y	N. KURAMOTO: "Preparation of Processable Polyaniline Doped and Complexed with Anionic Surfactant" POLYMERS FOR ADVANCED TECHNOLOGIES, vol. 9, March 1998 (1998-03), pages 222-226, XP000738255 page 222 - page 226 -----	1-15
A	GB 2 360 524 A (COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH) 26 September 2001 (2001-09-26) claims 1-22 -----	1
A	EP 0 545 729 A (NESTE OY) 9 June 1993 (1993-06-09) page 3, line 46 - page 4, line 1; claims 1-22 -----	1.
A	US 5 403 873 A (E. NAKAMURA) 4 April 1995 (1995-04-04) column 3, line 52 - column 5, line 7; claims 1-9 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. Application No

PCT/US 03/05771

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9805040	A	05-02-1998	FR 2751660 A1 EP 0916141 A1 WO 9805040 A1 JP 2001501017 T US 6235220 B1	30-01-1998 19-05-1999 05-02-1998 23-01-2001 22-05-2001
US 5320780	A	14-06-1994	US 5425995 A	20-06-1995
WO 9527289	A	12-10-1995	FR 2718140 A1 DE 69508014 D1 DE 69508014 T2 EP 0701735 A1 WO 9527289 A1 JP 8511303 T US 5885711 A	06-10-1995 08-04-1999 12-08-1999 20-03-1996 12-10-1995 26-11-1996 23-03-1999
WO 9918621	A	15-04-1999	AU 1028599 A AU 9629298 A CA 2305384 A1 DE 59806761 D1 WO 9918625 A2 WO 9918621 A1 EP 1023746 A1 EP 1027744 A2 JP 2001519464 T JP 2001519589 T TW 432733 B US 6642294 B1 US 2004054057 A1 ZA 9808953 A	27-04-1999 27-04-1999 15-04-1999 30-01-2003 15-04-1999 15-04-1999 02-08-2000 16-08-2000 23-10-2001 23-10-2001 01-05-2001 04-11-2003 18-03-2004 03-04-2000
EP 1052654	A	15-11-2000	AT 258709 T DE 60007914 D1 EP 1052654 A1 JP 2000357419 A	15-02-2004 04-03-2004 15-11-2000 26-12-2000
GB 2360524	A	26-09-2001	NONE	
EP 0545729	A	09-06-1993	FI 915760 A FI 923580 A AT 217439 T DE 69232601 D1 DE 69232601 T2 EP 0545729 A1 JP 3108894 B2 JP 6136264 A US 5928565 A US 5346649 A AT 172480 T CA 2103512 A1 CN 1083826 A , B DE 69321673 D1 DE 69321673 T2 EP 0582919 A2 JP 3017903 B2 JP 6207012 A KR 238809 B1	06-06-1993 12-02-1994 15-05-2002 13-06-2002 12-12-2002 09-06-1993 13-11-2000 17-05-1994 27-07-1999 13-09-1994 15-11-1998 12-02-1994 16-03-1994 26-11-1998 27-05-1999 16-02-1994 13-03-2000 26-07-1994 15-01-2000

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/05771

Patent document
cited in search reportPublication
datePatent family
member(s)Publication
date

US 5403873

A

04-04-1995

JP

3056001 B2

26-06-2000

JP

5234417 A

10-09-1993